

# A Game of Search

Leif Azzopardi

School of Computing Science

leif.azzopardi@glasgow.ac.uk

University of Glasgow

## Abstract

Searching is central to our existence. The search for water, food and shelter. The search for employment, transport and love. Searching for things to do, places to go, and people to meet. Of course, in Information Retrieval, we are primarily concerned with the search for information, knowledge and wisdom. If searching is so central to our lives, then are there underlying search strategies that define how we search, and invariably how successful we are? Information Foraging Theory posits that our search behaviour is similar to how animals forage for food (as it is derived from Optimal Foraging Theory). But do people search in such a manner? And how can we test such a theory, when so many factors influence people's search interaction, behaviours and outcomes? In this talk, I will describe my search for mechanisms to test such theory - specifically focusing on games and gamification as a way to abstract the problem down so that experiments can be conducted in a controlled and precise manner.

## 1 Overview

During the GamifIR 2014 workshop [HKKM14], there were many different ways in which games and gamification were used or considered in the context of Information Retrieval. For example, games like Zomblingo [FGC14], Pagefetch [ABG<sup>+</sup>14] and the Beauty Contest [Har14] produced data that could

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be used to understand and evaluate aspects of the retrieval process (i.e. via games with a purpose). On the other hand, other researchers adopted various game mechanics with in their systems to enhance the quality of data captured [BMI14, MJMW14], to improve the engagement of users in tasks or experiments [HBAdV14, FLHRARC14] and to shape behaviours [PMRS14] (i.e. via gamification). In previous work, I focused mainly on developing games with a purpose: to evaluate how well people can use search systems and to assess their querying behaviours (see Fu-Finder [OPA11] and PageFetch [APG12, PA12] which were based on PageHunt [MCQG09]). However, in this talk, I will focus on how I have been using games as a way to test something more fundamental, that is to evaluate people's search strategies.

To kick off the talk, I will first present essentially an experiment to test people's search strategies under various conditions. The experiment uses a number of standard gamification techniques to gamify the experiment (i.e. Points, Badges, Leaderboards), but it is not really very much fun, and it is very abstract. Consequently, I needed a way to make the scenario more concrete and more enjoyable. Before showing how we attempted to do that, I will explain how we are using this system to gather data to test theories such as, Information Foraging Theory [PC99, SK86] and Search Economic Theory [Azz11, Azz14]. To focus the discussion, I will concentrate on presenting the core concepts from Information Foraging Theory, and how the theory can be applied to generate hypotheses about how people should interact under various circumstances. Then, I will demonstrate a number of games we have been developing which encode the same principles/underlying theory but in the disguise of fishing, gold mining and surviving a zombie apocalypse. Through such games, it is possible to precisely control the conditions and environment that the player is subjected to, creating an ideal experimental play ground to test the theory. I will describe different manipulations that we can perform and how they can be used

to simulate different aspects with in the information search process. I argue that if players do not act as predicted in such contexts then they are unlikely to do so in more complex and information rich environments. On the other hand, if they do, then it is quite possible that a person’s ability to optimise their search behavior and adopt search strategies that get the best from their interactions, are able to do the same when it comes to information search. However, it is an open question, as to how well findings from such games can generalize to information search and information seeking more broadly.

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